Claims

What is claimed is:

1. A node-and-strut structure comprising:

a set of at least six vertebrae each including one left-hand strut having a proximal portion and a distal portion, one right-hand strut having a proximal portion and a distal portion, and one primary node rigidly engaging the left-hand strut's proximal portion and the right-hand strut's proximal portion, a primary axis passing through each of the primary nodes, the primary nodes each including at least 1% metal by weight, the left-hand struts all being nominally mutually parallel, the right-hand struts all being nominally mutually parallel also;

several left-hand nodes each bearing against a respective one of said left-hand struts' distal portions such that a left-hand axis lying in a baseplane with the primary axis passes through each of the left-hand nodes, the left-hand axis forming with each of the left-hand struts an acute angle about equal to $j\times20.9° + k\times31.7° + m\times36° + n\times37.4°$, where j, k, m, and n are each an integer ≥ 0; and

several right-hand nodes each bearing against a respective one of said right-hand struts' distal portions such that a right-hand axis parallel to the baseplane passes through each of the right-hand nodes, the right-hand axis forming with each of the right-hand struts an acute angle about equal to $p\times20.9° + q\times31.7° + r\times36° + s\times37.4°$, where p, q, r, and s are each an integer ≥ 0.

2. The node-and-strut structure of claim 1 in which said nodes each primarily comprise an iron-containing alloy.

3. The node-and-strut structure of claim 1 in which said nodes each include at least 1% metal by weight.

4. The node-and-strut structure of claim 1 in which said struts each include at least 1% carbon fiber by weight.

5. The node-and-strut structure of claim 1 in which all of said acute angles that are formed with the left-hand axis are within 0.4° of $j\times20.9° + k\times31.7° + m\times36° + n\times37.4°$.

6. The node-and-strut structure of claim 1 in which said left-hand and right-hand nodes each have a metallic surface bearing against a respective one of said distal portions.

7. The node-and-strut structure of claim 1 in which the left-hand and right-hand struts of each of the vertebrae form a primary angle therebetween that is nominally equal to an acute angle of $b\times20.9° + d\times31.7° + e\times35.3° + f\times36°$, where b, d, e, and f are each an integer ≥ 0.

8. The node-and-strut structure of claim 1 in which the left-hand and right-hand struts of each of the vertebrae form a primary angle therebetween that is nominally complementary to an acute angle of $b\times20.9° + d\times31.7° + e\times35.3° + f\times36°$, where b, d, e, and f are each an integer ≥ 0.

9. The node-and-strut structure of claim 1 in which the left-hand and right-hand struts of each of the vertebrae form a primary angle therebetween that is nominally complementary to an acute angle of $b\times20.9° + d\times31.7° + e\times35.3° + f\times36°$, where b is a positive integer and d, e, and f are each an integer ≥ 0.

10. The node-and-strut structure of claim 1 in which the left-hand and right-hand struts of each of the vertebrae form a primary angle therebetween that is nominally complementary to an acute angle of b×20.9° + d×31.7° + e×35.3° + f×36°, where d is a positive integer and b, e, and f are each an integer ≥ 0.

11. The node-and-strut structure of claim 1 in which the left-hand and right-hand struts of each of the vertebrae form a primary angle therebetween that is nominally complementary to an acute angle of b×20.9° + c×30° + d×31.7° + e×35.3° + f×36° + g×37.4°, where b, c, d, e, f, and g are each an integer ≥ 0.

12. The node-and-strut structure of claim 1 in which the set of vertebrae are nominally regularly spaced.

13. The node-and-strut structure of claim 1 in which j>0.

14. The node-and-strut structure of claim 1 in which k>0.

15. The node-and-strut structure of claim 1 in which j=p=0.

16. The node-and-strut structure of claim 1 in which k=q=0.

17. The node-and-strut structure of claim 1 in which m=r=0.

18. The node-and-strut structure of claim 1, further comprising several additional strut ends each bearing against a corresponding one of the left-hand nodes.

19. The node-and-strut structure of claim 18 in which the number of said additional strut ends is exactly T, where T is at least 4.

20. The node-and-strut structure of claim 1 in which the set of vertebrae includes at least eight vertebrae.

21. The node-and-strut structure of claim 1, further including several inter-primary struts each coupled to a corresponding pair of the primary nodes.

22. The node-and-strut structure of claim 1, in which said nodes and several additional nodes are all positioned exteriorly so as to form an oblong shape substantially resembling a tube having an elliptical cross section, further comprising several other, interiorly-positioned nodes.

23. A method of making a node-and-strut structure comprising steps of:

(a) assembling a set of at least six vertebrae each including one left-hand strut having a proximal portion and a distal portion, one right-hand strut having a proximal portion and a distal portion, and one primary node rigidly engaging the left-hand strut's proximal portion and the right-hand strut's proximal portion, a primary axis passing through each of the primary nodes, the primary nodes each including at least 1% metal by weight, the left-hand struts all being nominally mutually parallel, the right-hand struts all being nominally mutually parallel also;

(b) bringing several left-hand nodes each to bear against a respective one of said left-hand struts' distal portions such that a left-hand axis lying in a baseplane with the primary axis passes through each of the left-hand nodes, the left-hand axis forming with each of the left-hand struts an acute angle about equal to $j\times20.9° + k\times31.7° + m\times36° + n\times37.4°$, where j, k, m, and n are each an integer ≥ 0; and

(c) bringing several right-hand nodes each to bear against a respective one of said right-hand struts' distal portions such that a right-hand axis parallel to the baseplane passes through each of the right-hand nodes, the right-hand axis forming with each of the right-hand struts an acute angle about equal to $p\times20.9° + q\times31.7° + r\times36° + s\times37.4°$, where p, q, r, and s are each an integer ≥ 0.

24. The method of claim 23, further including a triangulation step (d) of adding to said node-and-strut structure several additional nodes and several additional struts so that all of the nodes each bear against at least 3 of the struts that are not nominally mutually coplanar.

25. The method of claim 24 in which said struts each have an actual length that is nominally included in a predefined length set consisting of 6 lengths.